



1775

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Tadayuki TSUTSUI et al.

Group Art Unit: 1775

Application No.: 09/993,562

Examiner: M. Lavilla

Filed: November 27, 2001

Docket No.: 111223

For: MECHANICAL FUSE AND METHOD OF MANUFACTURING THE SAME

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REQUEST FOR RECONSIDERATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In reply to the September 24, 2003 Office Action, reconsideration of the rejection is respectfully requested in light of the following remarks.

Claims 1 and 3-15 are pending herein, with claims 11-15 having been withdrawn from consideration.

I. Claims Rejections Under 35 U.S.C. §102(b)

Claims 1, 3-6 and 8 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 5,427,600 (hereinafter "Itoh"). This rejection is respectfully traversed.

Claim 1 recites a mechanical fuse composed of Fe-based sintered alloy, wherein the roundness of pores of the Fe-based sintered alloy is 0.004 or more. Because the shapes of the pores in the present invention are round, stress concentration to the pores can be eased and notch sensitivity is reduced, whereby fatigue strength can be improved. See, for example,

paragraph [0036] of the specification. This benefit of improving fatigue strength by the roundness of pores is nowhere taught or suggested by Itoh.

Instead, Itoh discloses that in order to improve fatigue strength, a raw powder is subjected to dry mill in an inert gas or air, thereby providing dislocation of the particle of the raw powder. See col. 2, lines 21-40 of Itoh. Furthermore, non-metallic inclusions such as oxides, nitrides, and carbides are milled to 50 μm or less and are included in the matrix to fine the austenite grain size.

Thus, Itoh teaches improving fatigue strength by dislocation of the raw powder particle, and fails to teach improving fatigue strength wherein the roundness of pores of the Fe-based sintered alloy is 0.004 or more, as recited in claim 1.

The Patent Office alleges that since the pores in Itoh are characterized as having a diameter of 50 μm or less, then Itoh discloses that the pores have a somewhat circular cross section. Here, Itoh is merely disclosing the size of the pores, and fails to teach the shape of the pores. Applicants further note that The American Heritage College dictionary defines diameter as a straight line segment passing through the center of a figure and terminating at a periphery. Thus, the term diameter does not explicitly refer to a "somewhat circular cross section".

Further, an object of the present invention is to have a high fatigue limit ratio. In contrast, Itoh discloses improved tensile strength as well as fatigue strength so that the fatigue limit ratio may not always be improved.

For the foregoing reasons, Applicants submit that Itoh fails to anticipate the subject matter of claim 1 or any of depending claims 3-6 and 8.

With respect to claim 3, the Patent Office alleges that Itoh discloses a 4x9x45 mm sintered alloy piece that has been nitrided, which would be expected to obtain an oxide coating. However, all of the examples in Itoh were performed in a non-oxidizing atmosphere

and oxides were not produced in the alloy pieces. That is, in Examples 1 and 2, the alloy piece is subjected to dry mill in Ar gas, anneal in N₂ gas, compacting, sintering in N₂ gas, forging and carburizing heat treatment. Accordingly, Itoh can not teach production of oxides. More specifically, Itoh fails to teach or suggest an iron oxide phase formed in a surface layer and pore inner wall, as recited in claim 3.

Still further, the Patent Office acknowledges that Itoh may not teach the claimed method of imparting compressive stress, but alleges that Itoh teaches compaction that allegedly would be expected to impart residual compressive stress. Contrary to the assertion made by the Patent Office, Itoh discloses that the alloy piece is subjected to sintering after compacting, and is subjected to carburizing heat treatment after forging. Thus, residual compressive stress generated in the compacting and forging is certainly released and is not maintained. Thus, Itoh fails to teach a mechanical fuse composed of Fe-based sintered alloy, wherein the roundness of pores of the Fe-based sintered alloy is 0.004 or more, and wherein a treatment for providing residual compressive stress is applied, as recited in claim 5.

For the foregoing reasons, Applicants submit that Itoh fails to disclose the subject matter of claim 1 or any of depending claims 3-6 and 8.

Reconsideration and withdrawal of the rejection are thus respectfully requested.

II. Allowable Subject Matter

Applicants note with appreciation that claims 7, 9 and 10 were objected to as being dependent on a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1 and 3-15 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Date: December 23, 2003

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